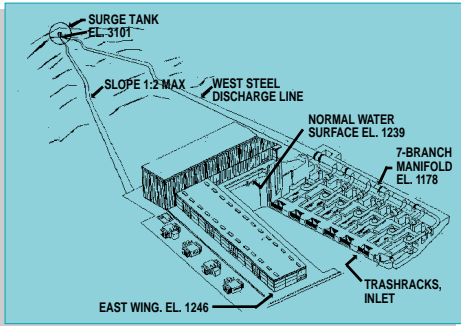


The State Water Project

The State Water Project is a water conservation and conveyance system that includes 29 storage facilities, 18 pumping plants, four pumping-generating plants, five hydroelectric powerplants, and approximately 660 miles of canals and pipelines.

A. D. Edmonston Pumping Plant

Located at the foot of the Tehachapi Mountains, the A. D. Edmonston Pumping Plant is the largest pumping facility of the State Water Project. Designed, built and operated by the California Department of Water Resources, the plant raises water from the California Aqueduct nearly 2,000 feet up the Tehachapis where it crosses the mountain range through a series of tunnels into Southern California.



After years of careful research and planning, construction of the pumping plant began in 1965. In 1971, Southern California counties received their first deliveries of Project water.

Design

The design and construction of A. D. Edmonston Pumping Plant presented engineers with a demanding set of challenges. To cross the Tehachapis, water would have to be raised nearly 2,000 feet and flow through approximately 10 miles of rugged mountain range. At full capacity operation, the quantity of water moved would be almost two million gallons a minute.

The U-shaped design of the plant is unique; no other SWP facility is similarly constructed. The plant consists of 14 motor- pump units, each standing over 65 feet high and weighing 420 tons. Seven units are located in each of the two wings each of which is nearly as long as a football field. Each unit discharges water into a manifold which connects into a main discharge line tunnel measuring 12.5 feet in diameter for its first half and 14 feet in diameter in the last half. The two main discharge lines, each containing 8.5 million gallons of water at all times, stair-step 8,400 feet up the mountain side to a 68 feet high, 50-foot diameter surge tank. (The surge tank prevents tunnel damage from large pressure changes that can occur when valves in the pumping plant are suddenly opened or closed).

Near the top of the lift, 14-foot diameter valves can close each discharge line in the event of a system rupture and minimize water flowing back down into the plant below. Other valves seal off the individual pump units from the manifold at plant level.

California Department of Water Resources' Mission...

To manage the water of California, in cooperation with other agencies, to benefit the state's people and protect, restore and enhance the natural and human environments.

A. D. Edmonston Pumping Plant



PETE WILSON
Governor
State of California

DOUGLAS P. WHEELER
Secretary for Resources
The Resources Agency

DAVID N. KENNEDY
Director
Department of Water Resources



Forebay

At the upstream entrance to the plant, the aqueduct enlarges to a wedge-shaped forebay, 70 feet deep. This design allows smooth intake of water to the pumps. Trashracks keep debris out of the pumps. When necessary, steel gates are used to block off the water intakes to the pump units.

Inside The Plant

The plant consists of six levels and visitors enter at the sixth and top floor of the plant. In the central portion of the sixth floor is the control room, where operations staff monitors the equipment 24 hours a day. The control room is connected to the Area Control Center of the San Joaquin Field Division, which is responsible for operation and maintenance of all SWP facilities located between Kettleman City and the Tehachapi Mountains.

On the fifth floor, below the control room, is the electrical gallery where power lines enter the building. (About 946 miles of wire and cable were used for the plant's electrical systems.)

The tops of the pump motors can be seen in each wing of the fourth floor. These huge 80,000 horsepower (hp) electric motors turn the pumps, which consist of four impellers rotating on a single shaft. Water spiraling up through the pump increases in pressure by more than 30 times before it is finally released to the discharge line.

A central section of the fourth level houses two motor generator sets, which are used to start the 80,000 hp motor-pump units.



Motor-generator room



A.D. Edmonston lifts water higher than any pumping plant in the world.

These 35,000 hp motors drive the generators that gradually transfer power to the pump units, which are too massive to start by switching power directly to them.

Using this system, three to four minutes are needed to start each pump. When operating, each motor-pump unit normally uses about 60 million watts, enough power to light up 600,000 100-watt light bulbs.

Access to the pump motors is through the third level, where high voltage lines carry power to these units. Air pressure tanks and hydraulic system



A full view of one of the 14,220 ton pumps.

reservoirs, also located here, supply a variety of the plant's operation and maintenance functions.

On the second and first levels are the pumps. Here, water enters the plant from the bottom of the forebay. About 142,000 gallons of water flow through each pump during every minute that it operates. An acre-foot of water (about 326,000 gallons, the average amount of water up to two families use in a year) is pumped in little over two minutes.

Seismic Safety Features

The A. D. Edmonston Pumping Plant is in a seismically active area. The Project alignment crosses the Garlock Fault and numerous other faults, while the San Andreas Fault passes 5.5 miles from the south portal (outlet) of the Tehachapi crossing's tunnel system. Because of these seismic conditions, many of the plant's features were designed to minimize earthquake damage.

To withstand earthquake shocks, the foundation of the plant rests on bedrock, allowing the facility to "float" on the rock surface. Approximately 190,000 cubic yards of reinforced concrete were used in the plant, enough to pave nearly 30 miles of a four-lane highway.

Tehachapi Tunnels

Upon leaving the surge tank located approximately 2,000 feet above A. D. Edmonston Pumping Plant, water enters a 23.5-foot diameter line and flows by gravity through a series of four tunnels in the Tehachapi Mountains. These tunnels are connected by siphons or cast-in-place pipe sections which also provide worker access to the system at critical fault crossings.

After its 10-mile journey from Edmonston Pumping Plant to the Tehachapi Afterbay, the water continues to the bifurcation (split) of the California Aqueduct into the West Branch and East Branch aqueducts.

A.D. Edmonston

As former California State Engineer and Chief of the Division of Water Resources from 1950-55, Arthur D. Edmonston directed the early planning of the Central Valley Project, the State Water Project, and the State Water Plan. He actively supported State financial assistance to build the State Water Project.

He was also secretary of the State Water Resources Control Board, Executive Officer of the State Water Project Authority, and a member of five other boards or commissions dealing with water issues.

Visitors Center

At the A.D. Edmonston Visitors Center, you can view pictures, graphic wall displays, and videos of the State Water Project and A.D. Edmonston Pumping Plant area.

To visit the Visitors Center and tour the A.D. Edmonston Pumping Plant, you must make an appointment, Monday through Friday 7 a.m. to 3:30 p.m. For more information, write: Department of Water Resources, San Joaquin Field Division, P.O.

Box 79398, Bakersfield, CA 93381 or call (805) 858-2211.



This display at the Visitors Center shows how the pumping plant lifts water over the Tehachapis.